

portion of it being removed by ulceration; it was of a light chocolate colour, and much thickened.

N. B.—I think it most probable that the abscess opened into the intestine before it did externally; the smallness of the aperture in the intestine will account for the late appearance of fecal matter in the abscess.”—N.

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ARTICLE VIII.—*Observations on the Treatment of Fractured Patella, with some Attempts at its Improvement.* By HENRY BOND, M.D.

Read before the Kappa Lambda Society, February 25, 1829.

Surgeons have exercised their ingenuity not a little to devise improvements in the treatment of *fractured patella*. And when we consider how obvious and clear the indications are in such cases, we might naturally have expected, that the practice would have arrived at such perfection that complete success, in ordinary cases, would have been almost certain; especially when it is considered that an imperfect cure is very seldom a necessarily unavoidable consequence of the accident, but is to be attributed to the employment of means inadequate to an attainable end, or to their unskilful application:

The possibility of a bony union is now universally admitted; and it will not be contended that there is often any difficulty in bringing the fragments into contact. But fractures of the patella, according to the acknowledgments of all surgeons, are very rarely united by bone, the connecting medium being in almost all cases, says Mr S. COOPER, a fibrous ligamentous substance; and he ascribes this fact chiefly to the very great difficulty of maintaining the surfaces of the fracture in complete contact, and perhaps in some measure to the ligamentous or tendinous structure of the adjacent and intervening parts. BOYER says, “strange as it may appear, the bones cannot be kept in contact; the apparatus constantly gets loose, and cannot be changed often enough to prevent this effect from taking place.” Mr JOHN BELL says, “to preserve the bones

(fragments of the patella) in absolute contact, and prevent this imperfection in the cure, is almost impossible." Mr CHARLES BELL says, "I believe it to be possible to make a cure by union of the bone, but the specimens of the new ligament in my collection will prove how difficult the attempt is, how often it fails."

This part of surgery being confessedly thus imperfect, the profession will, I trust, receive with candour any attempts to improve it.

The two chief indications are, 1. By the position of the patient to relax those muscles which are inserted into the patella. And 2. By means of a surgical apparatus to maintain this position, and to counteract the efforts of the muscles to separate the fragments.

Some authors have entertained the opinion, that a proper *position alone* was sufficient to effect a cure; and cases are related in the Memoirs of the Academy of Surgery, by SABATIER, where fractures of the patella were cured by an attention to this alone. Although we do not believe that treatment adequate to effect any thing more than an imperfect cure, it illustrates the importance of a careful attention to position. The joint must be completely extended, and retained there at least fifteen or twenty days, before any motion is allowed to the knee. BOYER says, he formerly taught that this joint should be moved early to prevent stiffness; but the fear of elongating or breaking the intermediate substance led him afterwards to a different practice. In general, he says, we do not permit our patients to begin to move the leg before the expiration of two months. The knee soon becomes flexible, and false ankylosis is never produced.

The hip joint should be flexid, and this may be accomplished either by elevating the body or by elevating the limb, or by elevating both at the same time. As the flexion must be continued many days, it should not be great. If it be such as to form an angle not differing much from one hundred and thirty-five degrees, it will produce the necessary relaxation of the *rectus femoris*, and be as easy a position as any for the patient; and it would be safest to maintain nearly the same angle during the cure. It may be necessary sometimes, for the comfort of the patient, to vary his position. He may be raised nearly or quite to a sitting posture; but, in so doing, the affected limb must be lowered to a horizontal posture. When he wishes to assume a recumbent posture, the limb must be elevated in a corresponding degree. The best ordinary posture



for him is to rest on two inclined planes, rising in opposite directions from the hips. The head and shoulders may be conveniently supported by placing beneath the bed or matrass a board, as broad as the shoulders, and long enough to reach from the hips above the head. Its proper elevation should be varied and secured by placing beneath it some support, which cannot yield and be deranged so easily as piles of pillows and blankets. The limb may be elevated by similar means, except that the board should be placed above the bed and covered with a folded blanket. This board is not, however, very necessary, as the elevation of the limb may be maintained by placing a support beneath the long splint with which the fracture is dressed. Particular attention should be given, that the foot receive its full share of support, and that it be not left hanging like a weight upon the end of a lever. If the limb and shoulders be both elevated at the same time, a moderate elevation of each will produce the requisite relaxation of the muscles; and, in all the changes of position, made for the comfort of the patient, the degree of flexion of the hip joint should be allowed little variation.

I suppose that the separation of the fragments does not depend so much upon the ordinary contractility or tenacity of the muscles (this being easily counteracted), as upon the sudden increase of it by some excitement. Every precaution should therefore be used to avoid this; and whenever the position of the patient is changed, he should not be allowed to feel the necessity of making any exertions either voluntary or involuntary. He should be moved in such a manner that he will not feel any apprehension of danger or accident. If he be allowed to assume an upright posture in bed by his own efforts in the ordinary manner, the *rectus femoris* will almost necessarily be called into action, and none of the ordinary modes of dressing would be likely to retain the fragments in contact. This should be considered a point of great practical importance by every one who expects to effect a complete cure; for, when any considerable time has elapsed, every separation of the fragments, although they should be immediately replaced, greatly lessens the probability of a bony union.

It would by no means answer as well to produce the relaxation of the *rectus femoris* solely by the elevation of the body of the patient, even if that position could be endured with the least inconvenience; for I consider the elevation of the limb a point of great practical importance on another account, besides the relaxation of

that muscle. It is one of the most efficacious means of avoiding or subduing inflammation and tumefaction, which are often objects of the most serious attention. In fractured patella the knee often suffers such violence, that for a considerable time, on account of the inflammation and swelling, we have no means left, besides position, for keeping the fragments in place. For this condition, which demands the most prompt attention, authors recommend "bleeding, and the usual remedies for inflammation." But none of them, as far as I know, reckon the elevation of the limb among the means of reducing the inflammation; although I would reckon it second to none in point of importance. For *preventing* inflammation where there should be much reason to apprehend it, I would give the limb a very considerable elevation, and allow the body to be nearly or quite recumbent; direct salts and sedatives internally; refrigerant and sedative topical applications; let the limb be unincumbered with bandages; keep the knee extended by means of a long splint, attached to the limb by four circular bands. I would not resort to blood letting to *prevent* inflammation, unless the condition of the system should demand it. If it should not be prevented by these means, I would join copious bleeding to the other remedies to *subdue* it. BOYER says cold applications "are particularly applicable before the accession of inflammatory symptoms." He says, "experience teaches us, that in the case in question, and in all similar cases, the immersion of the part in cold water is useful, and should be continued for several hours, the water being frequently renewed in order to keep it cold." But this treatment is not to be employed unless the surgeon see the patient soon after the occurrence of the accident. It is the opinion of the same author that leeches cannot, in the greater number of cases, be applied with safety, "for the irritation produced by their bites, added to that already existing, might bring on gangrene of the part, and the patient's death."

I concur in the opinion of Mr LATTA, that "while there remains any degree either of swelling, pain or tension, we cannot apply a bandage with any degree of propriety; nor can we even do so while there is good reason to believe that it will come on." BOYER adopted the same opinion, and it appears to me much sounder than that of Dr DORSEY, who says, "care must be taken to cover *every part of the skin* with the roller, because any part which is not thus supported will swell and inflame." This treatment of Dr D. would



seem to me one of the most certain means of aggravating the inflammation. From BOYER'S *Lectures on the Diseases of the Bones*, as edited by RICHERAND, it appears that he used a tight rolling bandage in his earlier practice; but on referring to his *Treatise on Surgical Diseases*, which was the result of matured experience, it will be seen, that he has wholly abandoned it.

Mr CHARLES BELL recommends a very slovenly, and what would seem to me a very inefficient practice; and it is not surprising, that his collection exhibits so many proofs of unsuccessful practice. He places the patient in a sitting posture instead of elevating the limb—places a neckcloth about the knee in the form of the figure 8, with certain “nooses,” which it is not easy to understand—applies no splint to keep the knee extended, and, for the relief of the patient, when he is tired of the sitting posture, lays him on his side. This gentleman, in his attempts to simplify the treatment, has adopted a practice which, in my view, is little better than leaving it to nature, without the interference of art. Much less could be expected from it than from that recommended by B. BELL and LATTA. Had the straps recommended by these gentlemen been combined with a long splint of proper width, it would have constituted an apparatus scarcely inferior to any now in use.

BOYER points out very clearly and justly the useless and mischievous effects of a bandage applied in the form of the figure 8, which was in use, especially in France, until DESSAULT introduced his mode of dressing. He says, “the bandage in the form of the figure 8 causes a congestion of the foot and leg, by not compressing the whole limb. Besides, the action of this bandage is oblique, and much of it is spent in merely compressing the neighbouring soft parts, which it irritates, and sometimes excoriates; neither is this inconvenience remedied by the pasteboard trough. The part of its action which is employed on the fractured parts is *always insufficient to keep them in contact*, if the constriction be not greater than the patient can bear for any length of time. If, in order to avoid this disadvantage, the bandage be not drawn sufficiently tight, its object will be entirely frustrated and its application useless.” These defects occasioned this bandage to be rejected, and led to the invention of another, which, he says, was *less objectionable*, and which is generally designated as DESSAULT'S apparatus. It is essentially the same as that recommended by Dr GIBSON, except that this gentleman substitutes the figure 8 bandage instead of the two long

compresses, which DESSAULT passed obliquely round the limb above and below the patella. Although this apparatus of DESSAULT was a decided improvement upon the simple figure 8 bandage, we can never expect, according to BOYER and as I believe, by means of it to keep the fragments in contact, and consequently never expect to obtain a bony union—the cure will be imperfect. This apparatus was long ago abandoned by BOYER for one of his own invention, and which is, in his opinion, “more simple than that of DESSAULT, and more certain in its action.” “Its advantages are, that it leaves the fractured part uncovered, so that we may judge at any time of its situation; that it exercises strong compression without endangering mortification; and that the straps may be loosened and tightened at pleasure without deranging the other part of the apparatus.” I cannot here forbear expressing my surprise that the sound judgment of Dr GIBSON should allow him to adopt a practice which, in my opinion, ought to be obsolete wherever the writings of BOYER are known. It is liable to most of the objections which BOYER has advanced against the simple figure 8 bandage. The long bandage, with which the limb is enveloped, invalidates them very little. A figure 8 bandage, as broad as that of Dr GIBSON, will have no decisive control over the patella, even if it were not liable to be loosened and deranged. It might prevent any extensive separation of the fragments, but it would not keep them in contact. Very tight bandaging might have some effect in rendering the muscles of the thigh quiescent, if it could be made to maintain a uniform tension. But the taper form of the part, its variation in size, either from swelling, compression, want of exercise or emaciation, and the liability of the bandage to stretch—all these circumstances forbid us to expect to maintain that tension. If the bandage become too tight, too loose, or otherwise deranged, it cannot be adjusted without deranging the whole apparatus.

Dr DORSEY adopted the principles of BOYER's apparatus with some modifications in regard to the simplicity of its structure, which, however, can scarcely be admitted to be improvements in point of utility. He adopts the practice which BOYER abandoned after mature experience—of enveloping the whole limb with a tight rolling bandage. To this practice I have already stated my objection. But it is to be particularly noticed, that the bandage, by which he proposes to “cover every part of the skin, so as to prevent swelling and inflammation,” is not applied to the naked limb, but includes



the long splint with its cushions and compresses. It must be very obvious, that it would be impossible to give a uniform support to every part of the skin by a bandage so applied.

I entirely approve of the principles of BOYER's apparatus, for I believe them to be so just, that the only improvements which can be expected in the treatment of this accident must be some modifications of its construction; and these must consist, either in simplifying it so as to require less art, labour, or expense in its construction, or in making it more comfortable to the patient, more easy in its application, or more certain to make the principles of his apparatus effective.

The apparatus which I would employ consists of—

1. A many-tailed bandage,
2. A cruciform splint,
3. A rolling bandage, and
4. Four ribbons or strips of muslin.

1. The *many-tailed bandage* is not an essential part of this apparatus, for often the treatment may be better managed without it or any primary bandage. But it may be used where it is necessary to envelope the limb for the comfort of the patient, either on account of excoriation, the maintenance of a proper temperature, or to support a flabby old limb inclining to the cedematous. It may be made by spreading a piece of leather three or four inches wide, and as long as the splint, with adhesive plaster or glue, and then laying upon it a row of strips of muslin overlapping each other, and of a length suited to the size of the limb. The leather is to be placed next to the skin, so as to cover that part of the limb which is to rest upon the splint. The limb is then to be enveloped with the tails of the bandage, beginning at the ankle, and taking care to leave the knee uncovered. The advantages of this bandage, where bandaging is expedient, are sufficiently obvious.

2. To make the *cruciform splint*, take a piece of board three inches wide or more, and long enough to reach from the ischium to the ankle; slightly hollow it its whole length. Across the middle or directly opposite to the knee, but not on the concave side, nail a thin piece of board two inches wide and five or six inches long. Along the whole length of the hollow side of the splint nail a strip of thick bookbinder's pasteboard, from ten to fifteen inches in width, according to the size of the limb. Opposite to the knee, the pasteboard must be cut away on each side so as to leave a va-

cancy of four inches. This pasteboard I do not consider an essential part of the splint, but it may contribute to give the limb a more safe and comfortable lodgement. Cover the splint with folds of soft flannel or a bolster, so made as to give the limb an even support in all parts. Upon this lay the limb, keeping the heel elevated as already directed, when speaking of position.

3. The *roller* should be made of firm new muslin or linen, not more than one and a half or two inches wide, and seven or eight yards long. If it be wider, it will not act so directly on the part where it is necessary to apply the most power; and, as all the turns of it are oblique, it will not be so easy to apply it smoothly. When the fragments are brought together, previously to applying this bandage, give them a triturating motion, by which any surrounding soft part that may have insinuated itself between them may be removed; and by the crepitus or the sensation communicated to the hand, we may ascertain that the fragments are in contact. Unless a considerable time have elapsed after the accident, this trial will generally give less distress than the attempts to produce crepitus in most other parts. In bringing the fragments together, it is not necessary to make the muscles more relaxed by the flexion of the hip joint, than they are when the dressing is finished; for if we cannot bring the fragments together without this extreme flexion, we may very reasonably apprehend, that none of the ordinary contrivances will keep them in contact when the flexion is diminished. In some cases it may, perhaps, be necessary to reduce the tonicity of the part by those means which produce muscular relaxation. In bringing the fragments together, care must be taken, if the muscles be much relaxed, that the upper one be not brought so low as to occasion the ligament of the patella to double upon itself; for in this case the axes of the two fragments might be made to form an angle with each, as in the case of M. Lallement, reported in BOYER'S surgery. If the fragments be allowed to lie as high as the ligament will permit, they will rest between the upper parts of the condyles, where they will be much more likely to retain their natural relation to each other, than if forced down opposite to the joining of the tibia and os femoris, and there would be less probability of any excrescences remaining on the articulating surface of the patella after the union of the fragments. After adjusting the position of the fragments, the roller is to be applied by carrying two or three turns of it below the lower fragment and above the



transverse part of the splint, so as to fix that portion. The rest of the bandage is to be applied by carrying it alternately above the patella and below the transverse part of the splint, and above this part of the splint and below the patella. There is very little danger that this bandage will slip or be deranged; but if any be apprehended it may be guarded against by inserting pins into it on each side of the knee. I see no particular need of a compress above and below the patella where the bandage passes; but there would perhaps be less danger of excoriation, if the parts were covered with strips of leather spread with adhesive plaster.

I have said that the width of the splint should be three inches or more, according to the size of the limb. I consider an attention to this point of very considerable practical importance, although Dr DORSEY seems to have viewed it as a matter of indifference. 1st, If the splint be as wide, or a little wider than the knee, it will prevent the bandage from acting on the side of the joint, so that nearly the whole force with which it is applied will act on the proper point, instead of being wasted on the adjoining parts, and the bandage will consequently require to be applied with less force. 2d, It will prevent pressing much on soft parts which by their yielding will render the bandage more liable to get loose. 3d, The bandage will not press upon the lateral parts of the joint, so as to interfere with the circulation throughout the limb.

4. *Four ribbons, or strips of muslin* twenty-five or thirty inches in length, are required to be carried around the limb, including the splint, and be tied—two above the knee and two below. With the observance of the directions which I have given concerning the position of the patient the dressing is finished. Although I have said that it is unnecessary to make any extraordinary flexion of the hip joint at the first dressing, it would probably be safest to increase the flexion whenever the roller requires to be removed or exchanged.

The advantages of the *cruciform splint* are,

1. The simplicity of its structure and its easy application.
2. The very little liability there is, that either the splint or bandage will be deranged.
3. It may be applied so firmly as to accomplish pretty certainly the chief indication, without interfering with the circulation of the limb.

The pain which the patient will suffer for a few hours after the

application of this dressing, is, I believe, unavoidable in any efficient treatment of this accident; but it is neither more severe nor protracted than that unavoidably suffered in the treatment of some other fractures; and we must encourage the patient to bear it in the hope that it will not be of long duration.

I have had only one opportunity to test the efficacy of the treatment here recommended. In the spring of 1823, I was called to Hannah Saunders, more than forty years of age, who had fallen in the street and fractured the left patella. She supposed it was occasioned by falling on the edge of a brick. It was dressed with a cruciform splint, and treated according to the principles advanced in this paper. I have seen the patient within a few days and examined the knee. I could not detect any deformity in the patella; there is no lameness in it, and she performs complete flexion and extension (squatting down and rising up) without the least inconvenience. I have no reason to doubt that bony union has taken place.

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ARTICLE IX.—*Of the Causes which retard perfection in the Healing Art.* By A. MATTHEY, M.D. of Geneva, the Academies of Dijon, Turin, &c. To the Kappa Lambda Society of Philadelphia. Translated from the original French by D. THEODORE COXE, M.D.

The curious changes which have taken place in the healing art consequent to the different revolutions in medical theory, i. e. the mode of considering the principle or nature of diseases, are well known; as are also the striking opposition and contrast in their treatment, produced, from the days of GALEN to the present time, by the humoral, mechanical, and chemical doctrines, and especially among the more modern by those of BROWN, TOMASINI and BROUSSAIS.

In coolly examining these perpetual differences of opinion, these continual contradictions, we readily perceive why profound thinkers have estimated medical science differently from theorists: we at